

ABSTRACT OF THE DISCLOSURE

An economical and easy to manufacture miniaturized fuel cell having fuel chambers formed from a substrate, such as a silicon wafer, to define a plurality of elongate fuel chambers in fluid-communication with each other within the substrate.

5 Elongate electrolytes, anodes and cathodes extend along the fuel chambers to maximize the effective electrolyte surface area, thereby increasing the amount of electrical current generated by the fuel cell. The elongate fuel chambers are preferably patterned within the substrate in a mirror image configuration such that two thin-film substrates may be joined together to define fuel chambers having two elongate electrolyte, anode, and cathode portions extending therealong. One or more the fuel cells in accordance with the present invention may be stacked within a suitable frame defining alternative layers of fuel and air (or oxygen) chambers, thereby defining a three-dimensional stack of fuel cells having a relatively small profile, but further increasing the current and/or voltage provided per unit volume.

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